

# Alternative Alignments

*Presented by:*  
Xavier Pagan &  
Catherine Bradley

June 2014



# ***Alternative Alignments***

- ◆ **Purpose and Need**
- ◆ **ACE in PD&E**
- ◆ **PD&E**
  - **Scope of Service**
  - **Data Collection**
  - **Alternative Analysis**
  - **Documentation**

# ***Purpose and Need***

- ◆ Defines the transportation problem to be solved (not a statement of a solution)
- ◆ Provides data to support the problem statement
- ◆ Sets the stage for consideration of the alternatives, must not be so specific as to “reverse engineer” a solution



# ***Purpose and Need and Data Collection***

- ◆ *Purpose and Need* - Lead Agency concurrence is a part of ETDM programming will be refined throughout the study
- ◆ This statement documents why this project is needed
- ◆ Early analysis of data collected substantiates the need for an improvement
- ◆ Purpose and Need and the data collection – form the basis for developing alternative solutions
- ◆ Purpose and Ne

# ***Purpose and Need Traffic***

## ◆ Design Traffic

- Design Traffic Volumes
- Design Speed
- Lane Call

## ◆ Level of Service

## ◆ Operations

- Intersections
- Interchanges

# ***Purpose and Need Multi-Modal Alternatives***

- ◆ Consider multi-modal alternatives
  - Bus
  - Rail
  - Transit
- ◆ Determine if the project should follow the FTA process?



# *Purpose and Need Facility Type*

- ◆ Existing Road or New Alignment
- ◆ Area Type
  - Urban vs. Rural
- ◆ Design Speed
  - High vs. low



# ***Alternative Corridor Evaluation In PD&E***

- ◆ **New alignments – new roadways; new roadway connections or extensions**
- ◆ **Major realignments**
- ◆ **Major bypasses – truck bypasses; city/town bypasses**

# ***Alternative Corridor Evaluation in PD&E/Basic Steps***

- ◆ **Define the Initial Corridor Alternatives**
- ◆ **District Makes Decision to Advance Project**
- ◆ **Develop Analysis Methodology Memorandum**
- ◆ **Refine Corridor Alternatives**
- ◆ **Alternative Corridor Evaluation Report**

# Alternative Corridor Evaluation During PD&E

From PD&E Manual Part 2, Chapter 6

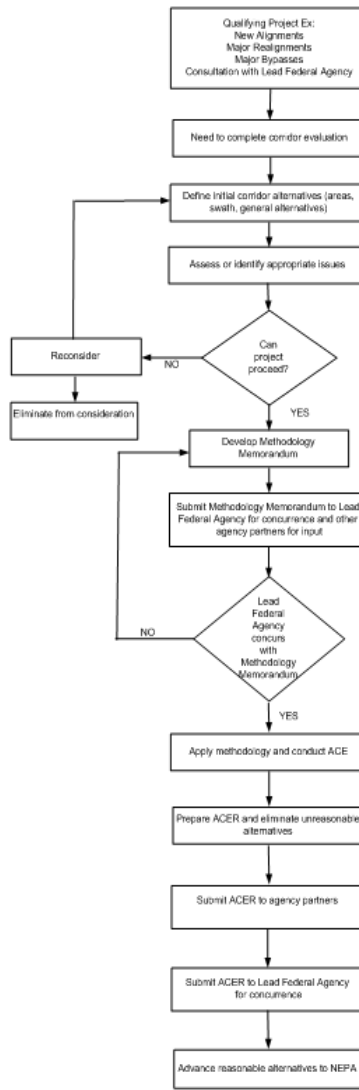
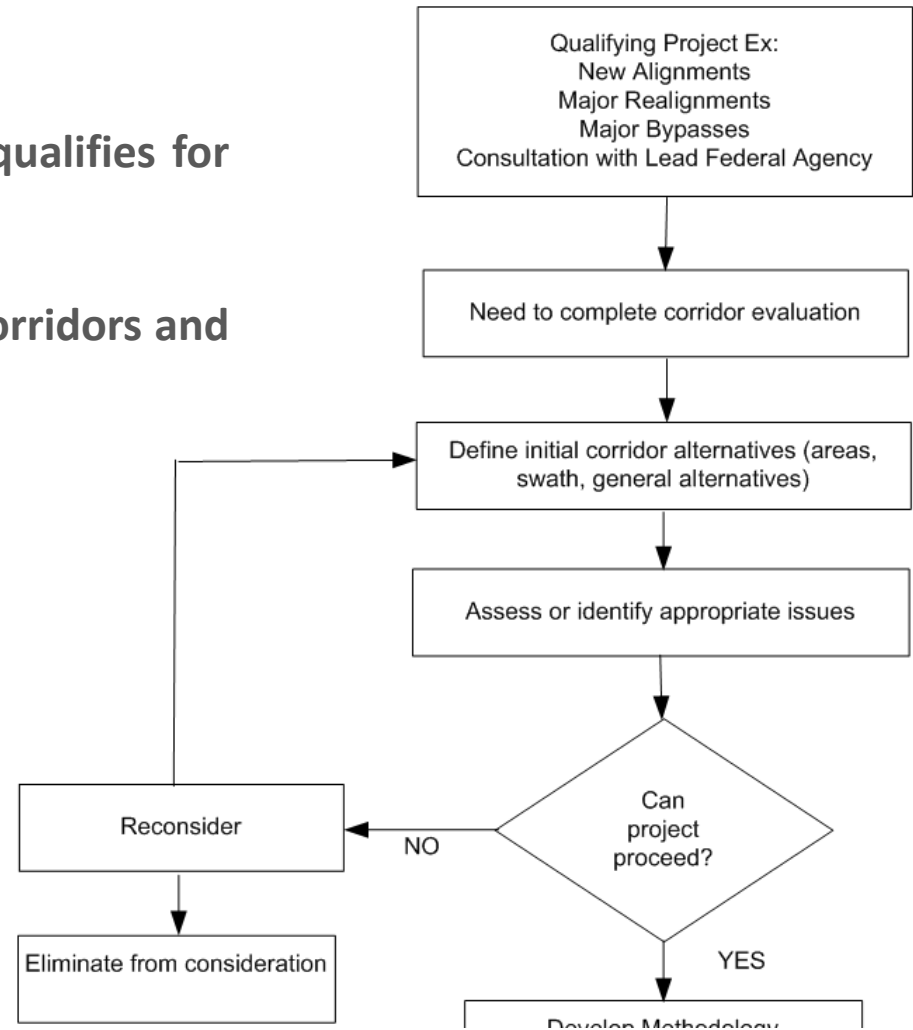


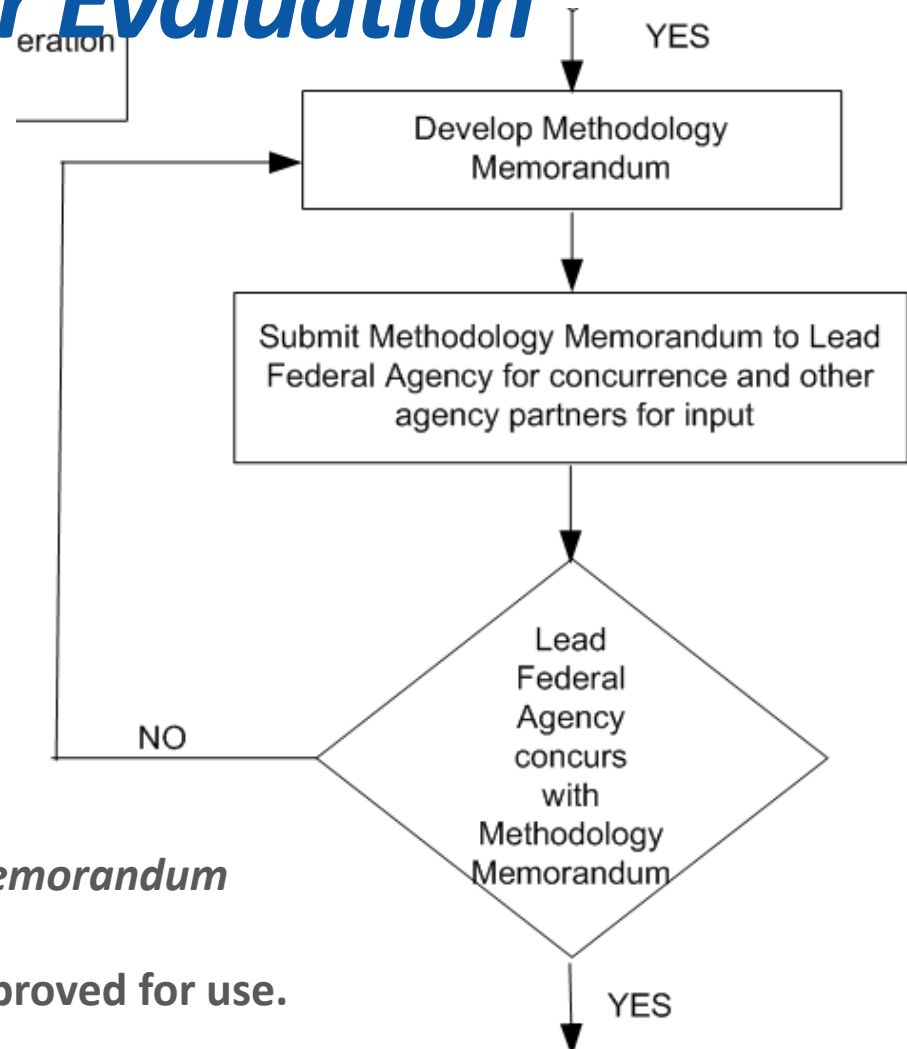
FIGURE 6.1 Alternative Corridor Evaluation Process

# Alternative Corridor Evaluation During PD&E

- The District determines if the project qualifies for ACE
- The District defines initial alternative corridors and performs an internal assessment



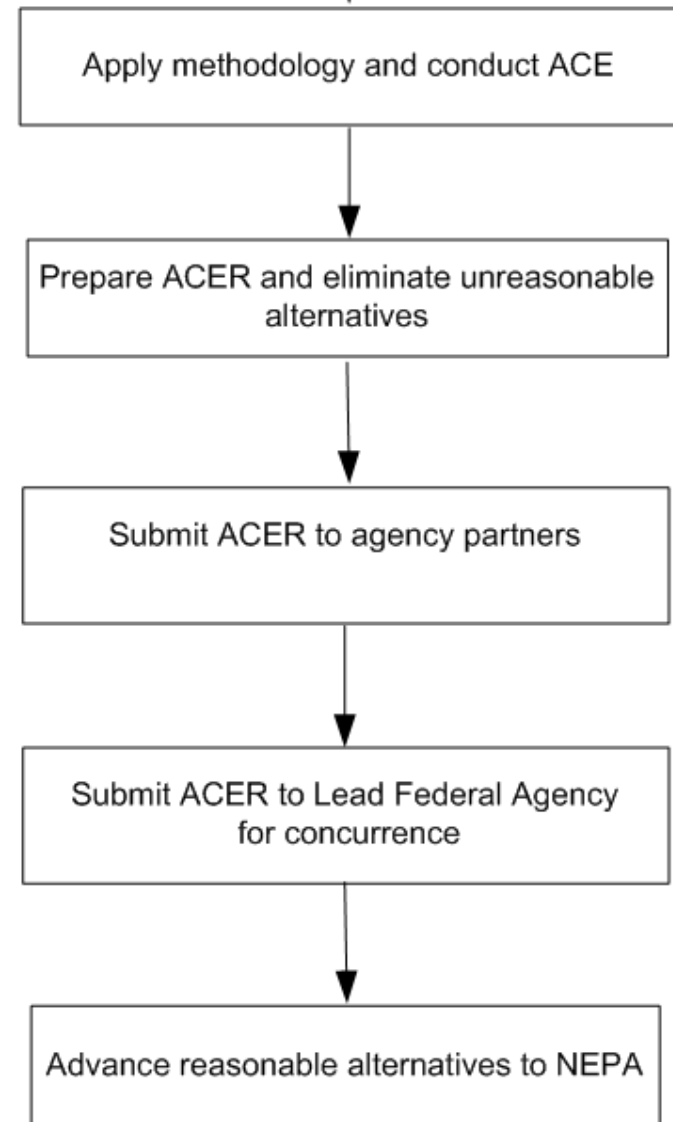
# Alternative Corridor Evaluation During PD&E



- District develops the *Methodology Memorandum*
- The *Methodology Memorandum* is approved for use.

# Alternative Corridor Evaluation During PD&E

- The District applies the approved methodology and refines the alternative corridors during the preparation of the *ACER*.
- At the conclusion of the review of the *ACER*, the District requests Lead Federal Agency acceptance of the elimination of unreasonable alternatives
- The results of the *ACER* identify the reasonable alternatives for *NEPA* analysis
- Acceptance of the *ACER* by FHWA.



# ***Results of ACE***

- ◆ Continuous coordination with Lead Agency including concurrence at decision points
- ◆ Documented involvement of stakeholders in decision-making
- ◆ Uses existing and new vetted technologies
- ◆ Flexibility in its application
- ◆ Information all in one place, products available for future phases
- ◆ Define Purpose and Need
- ◆ Define affected environment
- ◆ Identify reasonable alternatives for NEPA Analysis

# ***Prepare Scope of Services***

- ◆ **Review ETDM Programming Screening Report to Identify:**
  - **Project Need**
  - **Class of Action (if identified)**
  - **Engineering Required**
  - **Environmental Studies Required**
  - **Permit issues/Types**
  - **Dispute resolution issues**

# *Prepare Scope of Services*

## FIELD REVIEW

- ◆ Visit your project!!!
- ◆ Get a ‘feel’ for the area
- ◆ Look at land uses, businesses, buildings
- ◆ Look at conditions and pavement
- ◆ Look around and see:
  - Who might be impacted?
  - What issues might this study remedy?
  - What concerns might adjacent owners have?

# ***Prepare Scope of Services and Estimate Staffhours***

## **◆ Standard Scope of Work**

- Public Involvement
- Engineering
- Environmental
- Miscellaneous

**◆ [www.dot.state.fl.us/projectmanagementoffice](http://www.dot.state.fl.us/projectmanagementoffice)**

**◆ Identify required technical studies**

**◆ Identify potential project alternatives for study**

**◆ Outline the level of public involvement based on identified community concerns**

**◆ Discuss Document Layout**

# ***Alternatives to be Evaluated in PD&E***

- ◆ Based on project need and design standards, develop conceptual alternatives
  - No-Action Alternative
  - Transportation Systems Management and Operations (TSM&O Strategies)
  - Multi-Modal Alternatives
  - Build Alternatives
- ◆ Meet Purpose and Need

# ***No-Action Alternative***

- ◆ Describe the beneficial and adverse effects of doing no improvements
- ◆ Describe how the No-Action alternative addresses (or doesn't address) the need
- ◆ **ALWAYS** carry the No-Action Alternative through the entire study

# *Transportation Systems Management and Operations (TSM&O) Alternative*

- ◆ An alternative which optimizes the performance and utilization of existing infrastructure.
  - Managed Lanes
  - Conversion to Toll Facility
  - Operational Improvements
  - Multi-modal improvements
- ◆ May have been addressed in a Traffic Operations Study

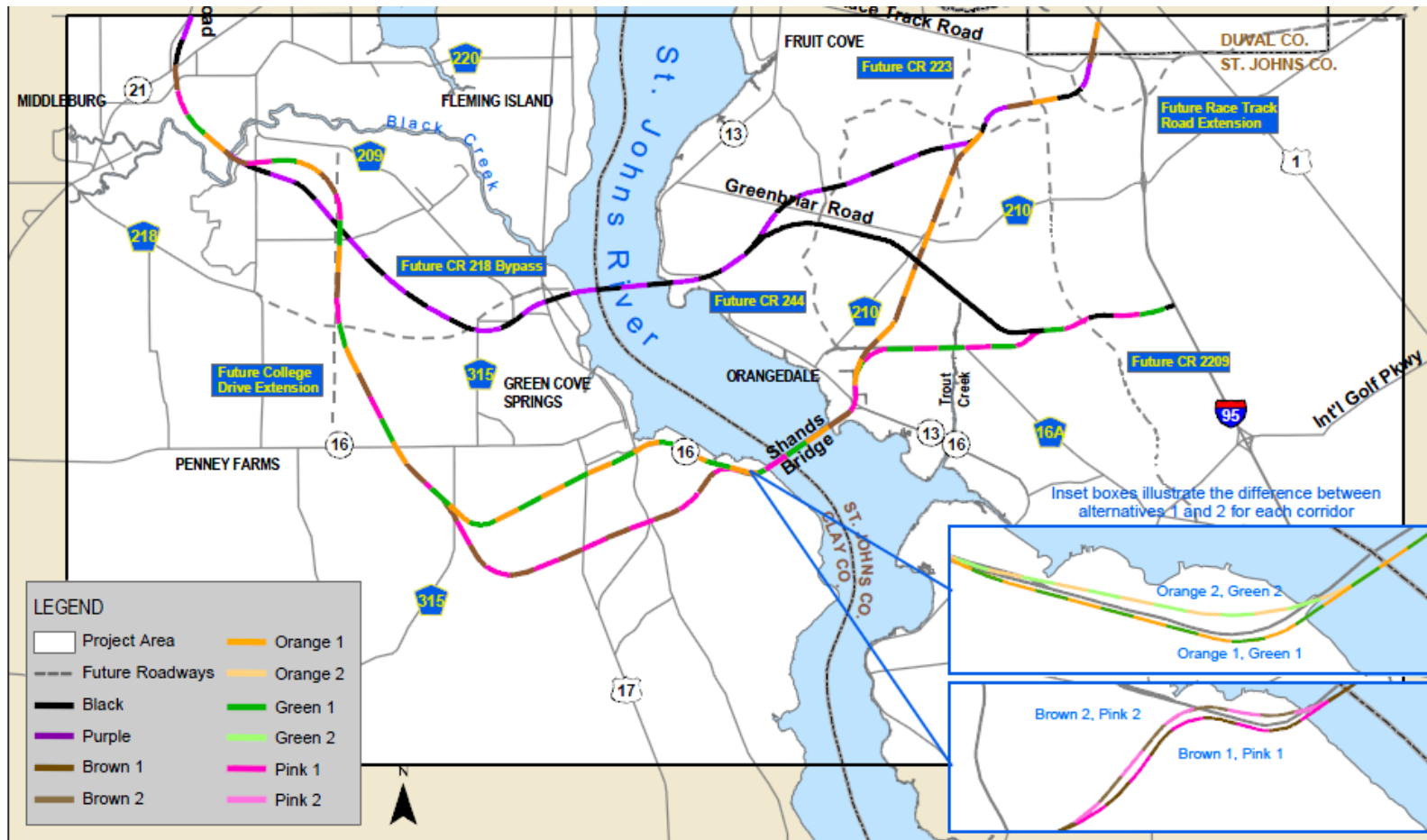
# ***Build Alternatives***

- ◆ **Meet the "Need" identified**
- ◆ **Are feasible**
- ◆ **FDOT Policy requires consideration of Tolling on all capacity projects**

# ***Build Alternatives***

- ◆ May go through iterations
- ◆ Begin to identify where Variances and Exceptions may be needed
- ◆ Begin to identify impact avoidance and minimization
- ◆ Develop a consistent naming convention
  - Alternative 1, Alternative 1a, Alternative 1b ...
- ◆ Alternatives laid out on base maps using aeriels and survey data

# Build Alternatives



# *Development of Alternatives*

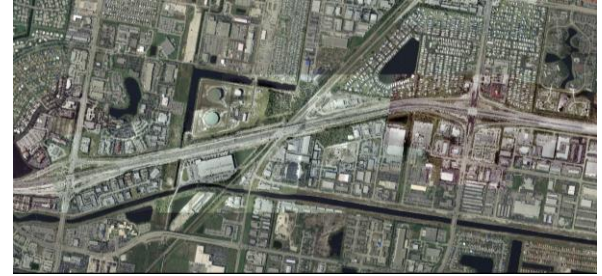
- ◆ Data Collection
  - Survey
  - Traffic
  - Existing Conditions
- ◆ Establish Engineering Controls
- ◆ Preliminary Engineering – at a minimum,
  - ◆ design traffic
  - ◆ horizontal alignment
  - ◆ typical sections
  - ◆ preliminary stormwater assessment
  - ◆ and any special details needed to address public or ETAT comments received during the ETDM Programming Screen and the PD&E phase.

# *Data Collection*

- ◆ FDOT Roadway Characteristics Inventory (RCI)
- ◆ Existing Roadway Plans
- ◆ Straight-line Diagrams
- ◆ Existing Structures Plans
- ◆ Crash Data
- ◆ Existing Signage
- ◆ Existing Utilities
- ◆ Railroads (if applicable)
- ◆ Transportation Plans



# Aerials



- ◆ Scope identifies coverage areas
  - Determines if using existing aerials or new ones flown
- ◆ Scope outlines “scale”
  - Project Location Map     $1' = 300'$
  - Alternatives                       $1' = 100'$
- ◆ Smaller scale (lower #) is better for close-up views (intersections, interchanges)

# Survey

- ◆ PD&E Study usually has some level of survey
  - Low Altitude Mapping Photography (LAMP)
  - Digital Terrain Modeling (DTM)
- ◆ Initial survey work (at beginning of project)
  - Base line
  - Roadway Center line
- ◆ Save some survey time for later issues
  - Pond borings
  - Side streets



# *Design Traffic*

- ◆ FDOT Design Traffic Procedure  
#525-030-120
- ◆ Traffic Study
  - Previously done vs. part of PD&E
- ◆ Traffic Methodology
- ◆ Traffic Forecasts/Projected Volumes
- ◆ Level of Service
- ◆ Design Traffic Technical Memorandum
  - Documents Traffic volumes that will addressed by conceptual alternatives



# *Design Traffic Analysis*

- ◆ Establishes Design Traffic Volumes
- ◆ Addresses Opening, Interim and Design Years
  - AADT and Design Hour
  - LOS
  - Year LOS hit “F”
- ◆ Examines Multi-Modal
  - Bus, Rail, Ports ...
- ◆ Pedestrian Counts



# *Interchange Design Traffic*

- ◆ Projects Involving the Interstate and providing access:
  - Interchange Justification Report (IJR)
  - Interchange Modification Report (IMR)
- ◆ To be coordinated with the DIRC
- ◆ Approved by the Lead Agency



# ***Build Alternatives***

## ◆ **Establish controls and standards for design**

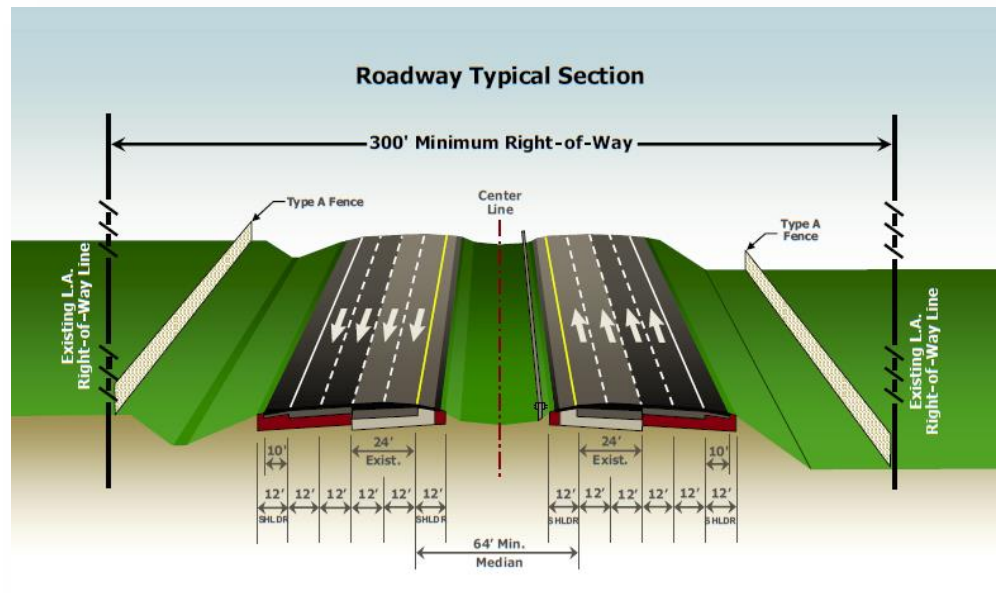
- Functional Classification
- Design Speed
- Access Classification
- Season High Water
- Clear Zones
- Shoulder / Median / Lane Width
- Grades
- Side Slopes
- Minimum Horizontal and Vertical Clearance
- Superelevation
- Sight Distance

## ◆ **Context Sensitive Solutions**

- Policy 000-650-002

# Typical Sections

- ◆ Functional Classification
- ◆ Design Speed
- ◆ Design Controls



# *Every Day Counts/Level of Detail*

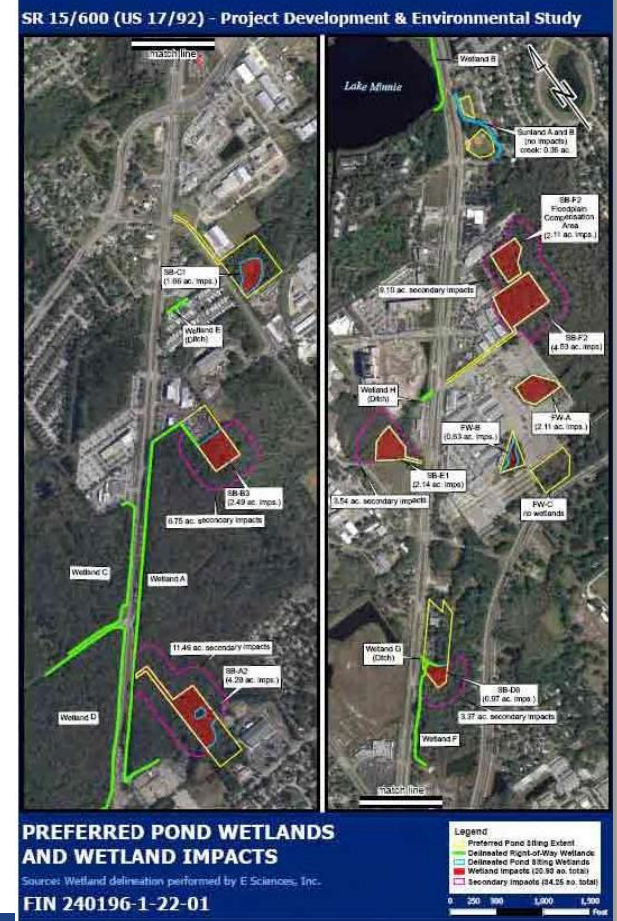
- ◆ FHWA ORDER Classification Code 6640.1A - Policy on Permissible Project Related Activities during the NEPA process, dated October 1, 2010.
  - Preliminary Design
  - Final Design
  
- ◆ FHWA will allow any work to be completed by FDOT in the PD&E process that is listed as “preliminary” in the *Sequence of Plans Preparation Chapter, Volume 2, Chapter 2, PPM, Topic No. 625-000-008, and Figure 2.1*.
  - Most items are in the preliminary phase or “P” through Phase II or 60% Design Phase.
  
- ◆ Any engineering work performed on one alternative prior to final NEPA approval must be approved by FHWA and not prejudice the objective comparison of all the alternatives or limit alternatives.

# Once Alternatives are developed...

- ◆ Begin to examine Drainage
- ◆ Begin to examine Environmental Impacts



Figure 7.5 Delineated Wetlands



# ***Drainage Analysis***

- ◆ **Potential drainage solutions are developed**
  - **Swales**
  - **Off-Site Ponds**
  - **Curb and Gutter (Urban)**
- ◆ **Meet with Water Management District**
  - **Determine Criteria for treatment**

# ***Drainage and Water Reports***

- ◆ **Pond Siting Report (PSR)**
  - **Identifies potential and preferred pond site locations**
    - **ROW Impacts**
    - **Wetland Impacts**
    - **Other Environmental Impacts**
    - **Conveyance**
- ◆ **Location Hydraulic Report (LHR)**
  - **Identifies impacts to floodplains**
- ◆ **Water Quality Impact Evaluation (WQIE)**

# ***Variations and Exceptions***

- ◆ **Design Variations – Below Department Criteria but are not an exception**
  - ◆ **Approval required by District Design Engineer for all Variations**
- ◆ **Approval required by FDOT Chief Engineer and State Transportation Planner for changes in Design Speed on SIS or State Highway Facilities**

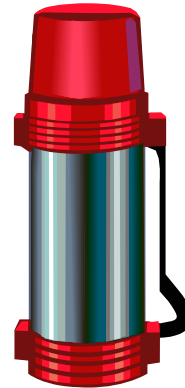
# ***Exceptions***

Below Department and AASHTO Criteria:

- ◆ Design Speed
- ◆ Lane Width
- ◆ Shoulder Width
- ◆ Bridge Width
- ◆ Structural Capacity
- ◆ Vertical Clearance
- ◆ Grades
- ◆ Cross Slopes
- ◆ Superelevation
- ◆ Horizontal Alignment
- ◆ Vertical Alignment
- ◆ Stopping Sight Distance
- ◆ Horizontal Clearance

# Coordination

- ◆ Commitments
- ◆ Design
- ◆ ROW
- ◆ Drainage
- ◆ Structures
- ◆ Lead Federal Agency
- ◆ Etc.



# *Alternatives Matrix*

- ◆ Required Information on Matrix
  - Constructability
  - Construction Cost
  - Engineering Cost
  - ROW Costs
  - Bicycle Pedestrian Facilities
  - Temporary Traffic Control
  - Environmental Impacts
  - Social and Economic Impacts
  - Operational Analysis
  - Safety Benefits

# *Alternatives Workshop*

- ◆ Once Alternatives are developed and initial impacts identified
- ◆ Hold an Alternatives Public Workshop
  - Present alternatives
  - Gather public comment
  - Help refine alternatives



# ***Value Engineering***

- ◆ Required for projects costing \$20 MIL +
- ◆ Schedule with District VE Team
  - Week-long event
  - VE Report prepared in advance
- ◆ VE recommendations summarized in PER and Environmental Document

# ***Refine Alternatives***

- ◆ **Incorporate Public Comments**
- ◆ **Make adjustments to alternatives as necessary**
- ◆ **One alternative will begin to become the “Preferred Alternative”**

# ***Public Meeting or Hearing***

## ◆ **Once Alternatives are Refined**

- **FDOT Recommended Alternative**
- **Present Alternatives**
- **Present the No-Action Alternative**
- **Gather public comment**



# ***Identify a Preferred Alternative***

- ◆ **Identify a Preferred Alternative**
  - **After public comment is gathered**
  - **Additional Input**
- ◆ **Preferred Build Alternative identified**
- ◆ **Preferred Build vs. No Action**

# Select Preferred Alternative

- ◆ After Public Hearing, a decision can be made
- ◆ Decision on Build vs. No-Build



# ***Documentation***

- ◆ **Documentation**
  - **Environmental Document**
  - **Environmental Technical Studies**
  - **Preliminary Engineering Report**
- ◆ **A complete project file must be kept. The project file should be available to provide to the lead agency upon request.**

# ***Environmental Document***

- ◆ **All Reasonable (EIS) Alternatives objectively evaluated**
- ◆ **Briefly discuss reasons for eliminated alternatives**
- ◆ **Include No-Action Alternative**
- ◆ **If one exists, identify Lead Agency approved preferred Alternative**
- ◆ **Include mitigation opportunities**

# ***Environmental Document***

- ◆ **Type 2 CE: - Block 2b**
- ◆ **EA: – Alternatives Considered**
- ◆ **EIS: – Alternatives Including Proposed Action**
- ◆ **SEIR: - Section 2b**

# ***Environmental Document – Alternatives Section***

- ◆ **Alternatives Development**
- ◆ **Alternatives Considered but Eliminated**
- ◆ **Alternatives Considered for Additional Study**

# ***Environmental Document***

- ◆ **Alternative Development**
  - **Project History**
  - **Planning Reports**
  - **ACE**
  - **Description of original alternatives that were considered and the methodology used for evaluation**

# ***Environmental Document***

- ◆ **Alternatives Considered but Eliminated**
  - **Eliminated during Planning, ACE or PD&E**
  - **What point in process and criteria used to eliminate**
  - **Who was involved in establishing criteria**
  - **Rationale used for elimination**

# ***Environmental Document***

- ◆ **Alternatives Considered for Additional Study**
  - **Description of each alternative**
    - **Termini**
    - **Typical section**
    - **ROW requirements**
    - **Cost**
    - **Impacts**

# ***Preliminary Engineering Report***

- ◆ The purpose of the *PER* is to provide *technical engineering information*
  - *supplement's information provided in the Environmental Document.*
  - *supports the decisions made related to the project alternatives.*
  - describes the preferred alternative
- ◆ Signed and sealed by a Florida Registered Professional Engineer.

# *Outline of the Preliminary Engineering Report*

- ◆ 1. Cover Page
- ◆ The cover page should contain the following statement:
- ◆ “This preliminary engineering report contains detailed engineering information that fulfills the purpose and need for project \_\_\_\_\_.”

# *Outline of the Preliminary Engineering Report*

- ◆ 2. Summary of Project
  - ◆ a. The summary of the *PER* should include the
    - ◆ “This preliminary engineering report contains detailed engineering information that fulfills the purpose and need for project \_\_\_\_\_.”
  - ◆ b. Commitments and Recommendations
  - ◆ c. Description of Proposed Action

# ***Outline of the Preliminary Engineering Report***

- ◆ **3. Existing Conditions – Include information obtained in accordance with *Section 4-2.5.2.2***
- ◆ **4. Planning Phase/Corridor Analysis**
- ◆ **5. Project Design Standards - List required design standards obtained in accordance with *Section 4-2.5.2.1***

# ***Outline of the Preliminary Engineering Report***

## **6. Alternative Alignment Analysis**

- a. No - Build Alternative (advantages and disadvantages should be considered)
- b. Transportation Systems Management and Operations
- c. Multi-Modal Alternatives
- d. Alternative Evaluation (for each alternative)
- e. Evaluation Matrix – compare all major impacts, at a minimum include:
- f. Recommended Alternative - explain which alternative was chosen by the FDOT and/or project sponsor and the rationale

# ***Outline of the Preliminary Engineering Report***

- ◆ **7. Design Details of Recommended Alternative (including Typical Section Package)**
- ◆ **8. Conceptual Design Plans**
- ◆ **9. List of Technical Reports Completed for the Project**

# For More Information

## Presenters:

Xavier Pagan

850-414-5260

[Xavier.pagan@dot.state.fl.us](mailto:Xavier.pagan@dot.state.fl.us)

Catherine Bradley

850-414-4271

[catherine.bradley@dot.state.fl.us](mailto:catherine.bradley@dot.state.fl.us)

## References :

### ◆ FDOT PD&E Manual

- *Available at:*

<http://www.dot.state.fl.us/emo/pubs/pdeman/pdeman1.shtm>

# Questions

